Bad River Band of the Lake Superior Tribes of Chippewa Indians
FY2000 Nutrient Criteria Development
Proposal

Introduction

Located in northern Wisconsin on the shores of Lake Superior, the Bad River Reservation is a "water-rich" environment (see Map). The 124,000-acre Bad River Reservation is located within the northern third of the Bad River Watershed. Numerous rivers, streams, lakes, ponds, and wetlands, as well as groundwater, make up the water resources landscape of the Reservation. The Reservation water resources are considered to be of local, regional and global significance.

Significant water resources include the Kakagon/Bad River Sloughs wetland complex (listed on the National Registry of Natural Landmarks) and the associated near shore zones of Lake Superior. The Kakagon/Bad River wetland complex is a 16,000 acre wetland in nearly pristine condition hosting a rich assembly of flora and fauna flowing into Lake Superior, the largest fresh water lake in the world by surface area.

These water resources have provided both subsistence, and cultural/spiritual benefits to many generations of Bad River Chippewa. The Kakagon Slough holds the largest wild rice beds on the Great Lakes and are an integral part of the lives of the Tribal members. With these facts in mind, the Bad River Tribe feels that it is critical to have an active role in managing the water resource of the Reservation. Water is seen not only as the life blood for human society but is also essential to ecosystem health. Every effort should be taken to ensure that the water quality and quantity are capable of maintaining the life functions of the natural systems and sustaining a measure of quality that serves the needs of the Tribe and its future generations. Knowledge of the existing condition of the water resources is an indispensable tool in ensuring that the water continues to remain at a desired level of quality. The capacity to monitor the quality of the resource provides the tool of knowledge in the long term and indicates changes in the resource. With this knowledge and capacity, the Tribe can set successful long-term management goals.

The entire Lake Superior Basin in the State of Wisconsin is basically data limited. Funding cuts for the Wisconsin Department of Natural Resources in the 1990's reduced water quality monitoring carried out by the DNR in this region.

Agency Overview

The Tribe's Natural Resource Department has carried out many varieties of sampling and monitoring activities in the Sloughs and the Reservation as a whole, including water, wildlife and fisheries monitoring. In 1997, the Department achieved recognition from the National Oceanic and Atmospheric Administration for stewardship due to its coastal zone monitoring activities. The Water Office of the Natural Resources Department has monitored water quality of the sloughs and main rivers of the Reservation for the past three years. Other Water Office activities include macroinvertebrate monitoring, groundwater sampling, closure of abandoned wells, disposal site sampling and assessment, and wellhead protection planning among other activities.

Contact (resume attached)

Tracey Ledder, Water Resource Specialist, Bad River Band of Lake Superior Tribes of Chippewa Indians, One Maple Lane, Odanah, WI 54861 (715) 682-7103

Available or Newly Collected Data

The Bad River Natural Resource Department began a monthly monitoring program for the Reservation in 1997. Twenty-six sites around the Reservation are sampled for dissolved oxygen, specific conductance, pH, temperature, phosphate, nitrate, fecal coliform and total and suspended solids. The monitored sites include major river tributaries, streams and the Kakagon/Bad River Sloughs. A Hydrolab multiparameter field probe is used for DO, conductance, temperature and pH while the samples are collected for analysis in the Tribal water laboratory. Periphyton samplers have been used for 3 seasons at several locations in the Sloughs. Data collected under grant from USEPA following an approved quality assurance project plan. The most extensive landuse on the Reservation is logging by paper companies and private entities. Other impacts noted in past monitoring has been wastewater from municipal treatment in the watershed and failing mound systems. The Reservation as a whole is in good ecosystem health.

We propose to extend the existing monitoring plan to reference and impacted wetlands of various types on the Reservation (lacustrine, riverine, depressional). Several reference sites were selected by the wetland specialist using hydrogeomorphology principles and based on Wisconsins GIS wetland coverage. Sites would be field visited for verification and final selection. Samples would be taken on a seasonal basis – spring, early summer, late summer, autumn and ice cover. Data collected would include dissolved oxygen, temperature, phosphate, nitrate, solids, fecal coliform, periphyton (mass productivity) and chlorophyll a. Nutrient and productivity data will be correlated according to available draft or final USEPA guidance for nutrient criteria establishment for wetlands, rivers, streams and lakes. Data on nutrients and dissolved oxygen collected on reference wetlands here could be utilized as background for the establishment of regional nutrient criteria, other studies, wetland mitigation and environmental assessments.

All analyses except for chlorophyll a will be carried out in the Tribal water laboratory according to previously established standard operating procedures and quality assurance plans. Chlorophyll a analyses will be contracted from a laboratory with the expertise and necessary equipment for this more time consuming method.

This sampling regime will be carried out for two years in order to account somewhat for seasonal variability.

Description of Data Format

Field analytical data is recorded on field sheets along with observational data (weather, bank conditions, wildlife, air temperature, etc.). Upon laboratory analysis, results are recorded in a laboratory notebook. All analytical data is entered into an Excel database. This data format is compatible with the Tribes GIS ArcView system which can be used for mapping.

Facility

Records are kept in the Bad River Natural Resources Department in paper files, and on the network server (One Maple Lane, Odanah, WI 54861 (715) 682-7111. The Tribal water laboratory is also located at this address.

Contact for Data Submission

Tracey Ledder, Water Resource Specialist, (715) 682-703, will be responsible for data retrieval and collection, analyses, and submission of information.

Quality Assurance Procedures

All procedures in the Tribal water laboratory are carried out under established standard operating procedures and quality assurance plans approved by the USEPA under previous Clean Water Act 106 funding. The Hydrolab used to collect field data is maintenance before each sampling and calibrated each day according to established SOPs. Quality control samples are run for laboratory analysis. Phosphate and nitrate samples are analyzed by HACH spectrophotometer methods. Suspended and dissolved solids are analyzed according to gravimetric methods (Standard Methods). Fecal coliform is analyzed by membrane filtration (Standard Methods). Tribal Water Laboratory SOPS are in place for all analyses. Data is generally entered and checked by two different people. The same analytical methods would be utilized in the wetland studies. Chlorophyll a analyses would be carried out in a contract laboratory.

Funding Requirement

The Tribe will contribute the time of the Water Resource Specialist and Technician and water laboratory to the project.

Wetland Specialist @ half time $12,943/year

To assist in reference wetland selection, data retrieval, sample collection and analysis along with existing Water Resources Specialist and Water Resource Technician.

Laboratory supplies/reagents $3,000/year

To purchase necessary expendable analytical supplies such as weighing dishes, membrane filters, sample bottles, reagents, periphyton samplers (PVC and screening)

Contract laboratory	$3,900/year
Total per year	$19,843.00
Total per two year project	**$39,686.00**

Tracey Ledder
Water Resources Specialist

TECHNICAL EXPERIENCE IN WATER

Water Resources Specialist
Bad River Natural Resources Department - 1/97 to present
Plan and implement a water quality monitoring program, analyze samples for basic water chemistry, analyze data, write reports, write grant proposals for funding and write Tribal Water Quality Standards under the Clean Water Act

Watershed Management Program Intern
Stony Brook-Millstone Watershed Association - summer 1996
Analyze watershed chemical data and present results in GIS map, assist in implementation of a biological monitoring program, coordinate and train volunteers

Chemical, Biological and Visual Monitoring
Stony Brook-Millstone Watershed Association Volunteer - 7/95 to 12/96
Carry out chemical and macroinvertebrate monitoring and visual surveys on watershed

Analytical Chemist
Phytotech, Inc., Monmouth Junction, NJ - 4/95 to 10/96
Manage analytical laboratory, and carry out analysis of water, soil and plant material by ICP and FAA for start-up biotechnology firm using plants to remove heavy metals from groundwater and soil

Analytical Chemist
Virginia Tech, Environmental Engineering Department - 7/90 to 12/91
Graduate research assistant conducting research on the measurement of chlorine dioxide by-products in drinking water. Work included sampling in the field and lab analysis by ion chromatography and flow injection analysis

Research Assistant in Microbiology
Silliker Laboratories of New Jersey - 2/90 to 6/90
Tested water and processed foods for microbial content, assisted in experiments on food packaging

FIELD EXPERIENCE IN ECOLOGY

BioInventory Project
Stony Brook-Millstone Watershed Association - 3/96 to 12/96
Inventory plants and trees on 585-acre nature preserve as part of team project

Field Research
Cetacean Research Unit, Gloucester, Massachusetts - 9/88 to 12/88
Fall Intern; collected behavioral data for long term study of Humpback whale ecology, developed identification photos, narrated whale watch trips, worked as mate on whale watch boats

Field Research
Rocky Mountain Biological Lab, Crested Butte, Colorado - 5/88 to 8/88
Research Assistant; collected data for a study on Hummingbird feeding ecology, set and dismantled study sites, assisted in marking and banding birds, performed transect counts of food plants

FIELD EXPERIENCE IN SITE ASSESSMENT

Phase I Site Assessment
Hillman Environmental Company, Union, NJ - 9/94 to 4/95
Carry out legally defensible site assessments and historical searches for commercial property, write reports

Superfund Site Assessment
Commonwealth of Virginia, Department of Environmental Quality - 12/92 to 1/94
Carry our Preliminary Assessments and Site Investigations of CERCLIS listed sites, Project Officer, 40-hour OSHA certified, CLP methods for water, soil and sediment sampling, write reports to USEPA

INTERNATIONAL EXPERIENCE

Community Development Project Advisor
Lava Pie, Dominican Republic - 1/92 to 8/92
Technical advisor for latrine project; volunteer with the Presbytery of Elizabeth, NJ

Work Camp Coordinator/English Teacher
Dominican Republic - 1/89 to 1/90
Coordinated and led volunteer construction projects, translated, taught English; volunteer with the Presbytery of Elizabeth, NJ

EDUCATION

M.S. Environmental Science and Engineering
Virginia Polytechnic Institute and State University
Blacksburg, VA 12/91
Thesis: comparison of ion chromatography and flow injection analysis methods for monitoring chlorite and chlorate ions in drinking water

B.S. Biology
State University of New York
Binghamton, NY 1988
Intern at the Ross Park Zoo

PAPERS PUBLISHED

TD Ledder, AM Dietrich, DL Gallagher, MN Grabeel, RC Hoehn, "Comparison of ion chromatography and flow injection analysis methods for monitoring oxychloride disinfection by-products", paper 5A-1, AWWA Water Quality Technology Conference Proceedings, Orlando, FL, November, 1991, pp. 1027-1042.

AM Dietrich, TD Ledder, DL Gallagher, MN Grabeel, RC Hoehn, "Determination of chlorite and chlorate in chlorinated and chloraminated water by flow injection analysis and ion chromatography", Analytical Chemistry, 1991, 64, pp. 498-502.

Dave Pfeifer
Danielle Tillman
Regional Nutrient Coordinators
USEPA Region V WT-15J
77 West Jackson Boulevard
Chicago, IL 60604-3590

April 4, 2000

RE: Nutrient Criteria Proposal

Dear Regional Coordinators,

Enclosed, please find the Bad River Tribe's proposal for project funding under Section 104(b)(3) of the Clean Water Act, nutrient criteria development.

The proposed two-year project will analyze wetland nutrient data previously collected and collect further data on nutrients and mass productivity for analysis. The results will be utilized in establishing nutrient criteria for the Reservation (and surrounding similar wetlands), background levels for other investigations and site assessments and management decisions.

We hope you look favorably on this submittal. Please contact Ervin Soulier, Natural Resources Manager, or Tracey Ledder, Water Resources Specialist, at (715) 682-7103 for further information.

Sincerely,

Eugene Bigboy
Tribal Chair